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NASA GSFC - Planetary and Lunar  
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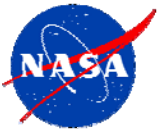
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# Planetary technology challenges ;

Planetary technology issues, challenges and thoughts.

- **Issue - the planetary proposals to NASA (Discovery, New Frontiers, and instrument proposals for larger missions) are limited by the knowledge and fear that significant technology development in a concept will kill its chances of proceeding.**
  - Tough to be competitive in this environment with any real technology development.
  - This is good for mission development risk which is good for HQ division planning. However this limits the science achievable in mid sized missions and this could be bad for long term advancement.
  - In these missions, competitive, partially funded phase As, combined with what tend to be short phase Bs, do not allow the introduction of technology development.
- **Related issue - HQ studies , decadal studies, early flagship mission studies intended to explore what is possible in competed programs, are also being effected by the knowledge and fear that some significant technology development is bad for future health of the mission**
  - Again this is good for programmatic planning and cost risk but could be bad for long term science return.
- **Is there enough technology support to feed and sustain to the missions and instruments necessary in the long term to meet future NASA planetary science goals?**



# Planetary technology challenges – mission technology ;

- A large amount of time and resources is spent trying to create concepts and instruments that enable new science with minimum cost and schedule risk.
  - At a minimum this means eliminating technology risk. There is plenty of technical and development risk without new technology challenges.
- How do we retire technology risk in competed planetary missions?
  - For mission technologies – internal IRAD will never make any great advancement. Mars technology, ASRG, NEXT, Flagship mission offices help.
  - Current approach is hard to describe it in a way that sounds like its integrated, open, competed and enough to sustain future missions.
- There were mission technology flight test programs. The trouble was the cost and advocacy given that cost.
- Recent attempts to create incentives to ‘push’ technologies into Discovery mission proposals through funded technology programs and pre AO studies, followed by significant cost incentives and pre AO studies is interesting.
  - Not sure its sustainable long term and does not necessarily make an AO selection even.
- Has anyone considered a separate competed program for higher risk SCIENCE missions where the other requirement is enabling a few important SCIENCE mission technologies.



# *Planetary technology challenges – instrument technology;*

For instruments - How well do PIDP, ASTID and other sources work? . Some thoughts;

- Center internal funds are low and really only fund exploring the basic ideas.
- ASTID and PIDDP do well in the early levels, PIDDP is underfunded , reducing the number of ideas that are advanced.
- The weakness and gap is in mid level TRL – advancing to a strong TRL 6+ so that it can really show up in missions at lower risk to that mission.
  - Its expensive-- the NASA centers and APL are experienced in instruments are well suited to bring instruments through mid level TRL, not all universities are. .
  - Need a post PIDP program to fill that gaps that's takes advantage of strengths, possibly allows partnerships.
- Better coordination between programs and more active linking to programmatic needs.
  - There on the order of 40 or so instrument types for planetary, but application and target change the technology for each.



## *Planetary technology challenges - Summary thoughts ;*

- There is little chance much new technology will get into anything but flagship level mission in the near term.
- Existing technology development sources probably not enough to allow feed into low risk missions
- Planetary technology spending does not appear to as coordinated or open as it could be.
  - Planetary technology money should be competed, at least within NASA centers.
- One could increase the planning and integration of ALL planetary technology spending and make the program more open and has more advocacy .
  - Use science, driven by the decadal, NRC and 'AG' group processes to identify the science goals and related missions that are limited by a low TRL, enabling, mission and instrument technology.
- *When looking at cost overrun causes in your questions for managers - There is a subtle nuance to 'technology being the reason for many overruns'. 'In mid sized missions with little major technology development, its often a smaller design issue that causes a problem. Still requires a novel , low TRL redesign of that small subsystem, interface or approach.*

